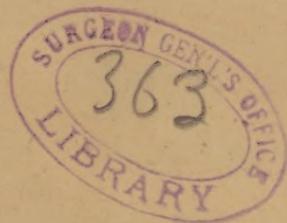


CHAILLE' (S.E.)

Inundations in Louisiana.

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[From June No. 1883, *New Orleans Medical and Surgical Journal.*]

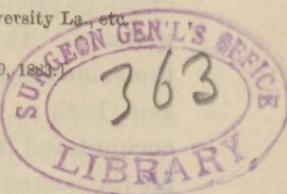
INUNDATIONS IN LOUISIANA.

THEIR INFLUENCE ON HEALTH.

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[Read before the Orleans Parish Medical Society, April 30, 1883.]



In the July number, 1882, of the NEW ORLEANS MEDICAL AND SURGICAL JOURNAL, I published an article on the "Inundations of New Orleans and their Influence on its Health." All the evidence which could be gathered from 1718, when New Orleans was founded, was recorded. This evidence, especially in respect to twelve inundations from 1816 to 1881, inclusive, was sufficiently full and satisfactory to justify the general conclusion that the inundations of New Orleans, always partial, "had not influenced unfavorably its mortality, whether by yellow fever, by cholera, by malarial fevers or by diseases generally. On the contrary, the evidence, though imperfect and not fully conclusive, justifies the inference that the deposit and decomposition of filth and any other promoters of disease, which may be due directly to inundations, are more than counter-balanced by the flood, which first covers up the soil, from whence springs so much disease, and then helps to cleanse it. If New Orleans were kept always perfectly clean, which far from the case now was less so in

remoter times, the influence of an overflow might then prove to be comparatively injurious." *

In concluding my article on the inundations of New Orleans, the intention was expressed of compiling an additional article upon the influence on health of overflows in rural districts, and physicians in such districts were solicited to contribute their evidence and information. In addition to this, considerable time and money were expended in distributing copies of this article, together with a circular letter, to some thirty-eight prominent physicians in the twenty-eight (out of the total fifty-nine) parishes in Louisiana, reported to have been more or less inundated by the worst flood on record, that of 1882. This effort, to collect information of public interest and importance, resulted in replies from ten only of the thirty-eight physicians, and respecting six only of the twenty-eight parishes. This fact alone, without citing other evidence to the same effect, will suffice to indicate to the medical profession, both at home and abroad, one of the many impediments encountered in Louisiana by whoever undertakes any research for the common good.

Such evidence as has been procured deserves record, because the best procurable. It is, however, necessarily imperfect, since it consists, for the most part, of opinions, which, even if correct, are founded neither on the requisite statistical data, nor on comparisons between years with and without overflows and between localities inundated and adjacent similar localities not inundated, nor on a due consideration of all attending and variable conditions. The evidence collected is as follows.

*In the tabular statement of the inundations of New Orleans contained in said article it is correctly stated that on May 11th, 1882, the rear of the 5th District of New Orleans or Algiers, also of Gretna and Gouldsboro, (all opposite New Orleans, on the west bank), were inundated, but it was incorrectly stated that this overflow terminated May 24th. The facts, as subsequently reported by the newspapers were as follows. On June 18th, the overflow still prevailed in the rear of Algiers and Gretna by which not less than 60 persons were afflicted. On August 12th, the water was still within 6 squares of the river front at Gretna, and was two feet deep in some streets. There had been "no unusual amount of sickness since the beginning of the flood." On August 17th it was reported that the water was rapidly receding, and that "there is hardly a house in the rear of town that does not contain one or more persons down with malarial fever." On September 3d, it was reported, respecting Algiers, that "since the fall of the water, immense quantities of dead fish and animal matter had been exposed to the sun, creating a fearful stench, and producing an epidemic of malarial fever." To this correction of an error, it is pertinent to add that a crevasse occurred at Gouldsboro on April 7th, 1883, flooding again the rear of Gretna and Algiers for about one week, as is reported.

OVERFLOWS OF 1844 AND 1850 IN THE COUNTRY.

THE NEW ORLEANS MEDICAL AND SURGICAL JOURNAL, Vol. I, p. 247, Oct. 1844, referring to the extensive overflow in the country, as being at its highest point July 30, 1844, reported as follows:

“ Let it be noted as a fact, which we think will be substantiated by the testimony of the profession, that, during the present year, when the Mississippi and its tributaries have been higher than they were almost ever known before, *all the river towns from New Orleans upwards have been unusually healthy whilst the interior and uplands throughout the Southwest have generally been sickly.*”

A newspaper reported, in 1882, to the same effect, as follows :

“ Many persons, living now, remember the high water of 1844, it was one of the healthiest years known in the history of the South, no yellow fever [epidemic] that year.”

In respect to the overflow in 1850 of extensive rural districts in the Mississippi Valley, Fenner's Southern Medical Reports, p. 754, Vol. II, stated that, “ as a general remark, it is worth mentioning that, notwithstanding the extensive inundation of 1850, the year was as healthy, if not more so, than usual.” From one part of the country, overflowed in May and June, 1850, Trinity, Catahoula Parish, La., Dr. A. B. Kilpatrick reported, p. 165, Vol. II, Fenner's Southern Medical Reports, as follows: “ The year in this section of the country, with the single exception of a transient visitation of the cholera in the month of February, has been as healthy as any year preceding. It has been contended by many, that *the seasons accompanying and immediately succeeding overflows are more healthy than others*, and the physicians in this vicinity contend that such has been the case this year.”

• PLAQUEMINE PARISH.

Respecting this extreme Southern parish, in which is located the mouth of the Mississippi river, two of the most experienced and competent observers in Louisiana, Dr. J. B. Wil-

kinson, of Myrtle Grove, and Dr. D. R. Fox, of Jesuit's Bend, have furnished the following information:

Dr. Fox reported June 5th, 1882, as follows:

"During my residence in this parish (a period of thirty years) I have witnessed eight overflows, of greater or less extent and produced by various causes. The first inundation of greater extent than ever known, either before or since, occurred in the spring of 1858 about the 25th or 26th of March, in the Parish of Jefferson, a mile or so above Gretna; it was known as the "Bell Crevasse," and was said to have been caused by an old rice flume. The back water reached this place—Jesuit's Bend—which is twenty seven miles from the Bell plantation by the river (though only ten in an air-line) on the 14th of April, and by the 20th, had submerged all the land to the base of the levee; twelve acres from the river, the depth of the water was from eight to fourteen feet. All the plantations on the Barataria Bayou, which runs about four miles in the rear of the river, were submerged to an average depth of nine feet. The overflow extended down the Mississippi River about forty-five miles, covering an area of about one hundred and eighty square miles. The back water did not begin to subside, nor did the river begin to fall, until the first week in August. While the water covered the land, the health of the neighborhood was remarkably good, but about the 1st of September *malarial fevers prevailed and many cases of pernicious fever occurred*; in November and December an *endemic of malarial pneumonia prevailed* on the Concession plantation, which is twenty miles below New Orleans; the same disease prevailed, though mostly among the negroes, on the Myrtle Grove plantation, twelve miles farther down, and was very fatal.

In 1861, two crevasses occurred in this parish; one on the Fairview plantation, which is on the left bank of the river thirty miles below New Orleans; this was about an acre in width and was caused by a land slide, or caving in of the bank; it was not closed until after the river went down. The other was at Jesuit's Bend, on the right bank of the river, and continued all summer, not being closed until fall. The inundations from

these crevasses were not of great extent, only a few of the adjoining plantations being submerged. *The health of the residents in the vicinity did not seem to be effected by them.* The usual fevers prevailed during the summer, but none of a malignant type.

The fourth crevasse took place in the spring of 1866, the last of March or 1st of April, on the Bouligny plantation, about six miles below Algiers; the cause was not ascertained, but was probably due to excavations by muskrats and crawfish. It was closed by the continued efforts of the planters, with aid from the city, and was remarkable for its depth, being twenty-one feet, the deepest ever known to be closed while the river was at its height. The city engineer, Mr. Demin-court, superintended the work. There was *no perceptible increase of sickness caused by this inundation.*

In 1874, two more crevasses occurred in Plaquemine Parish; one on the Belle Chasse plantation, right bank of the river, twenty miles below the city; the other on the left bank at Greenwood, twenty-three miles below New Orleans. The former was caused by the combined action of very high water, with severe storms of rain and wind upon a new levee; the latter was owing to the levee having been finished just before the spring rise, and to its having been improperly made as it was not faced with plank as is usually done. Both these were closed after the greatest efforts of the planters. The overflow extended only over a few of the adjoining plantations, and *caused no unusual sickness.*

In 1879, the levee in Jesuit's Bend was washed away by severe gales from the South and East, to the extent of 18 or 20 acres; the water covered the road about two feet in depth. After ten days hard work, the planters of the vicinity closed the break, and there was but little damage done by it and *no unusual sickness followed it.*

In 1881, a crevasse, from an imperfect rice flame on the Sarah Plantation, inundated the adjoining plantations for a short time; it was closed in about four weeks. *There was no perceptible increase of sickness.*

In March 1882, there was a break in the levee in the lower part of the Live Oak Plantation, which is on the right bank of the Mississippi, about twenty-three miles below New Orleans. The causes of this crevasse were bad drainage, crawfish and muskrat holes. After various futile attempts to close small breaks in the lower part of the plantation, a large one occurred near the upper line which soon attained a width of 400 feet, with an average depth of nine feet. After two attempts to close it, it was finally narrowed to within 30 feet; the work was suspended as usual for the night; the next morning it was found that some 50 feet of the piles, which had been driven, had been washed away and the channel was found to be twenty-five feet deep. The funds subscribed, having been exhausted, and no more being available, the break was abandoned. At the present time, it has a width of 200 feet, with an average depth of 15 feet. The area, inundated is about 100 square miles: the greater portion is swamp land. From present indications, *severe grades of fever and malarial dysentery may prevail later*; I have already met with several cases of both, which were unusually severe for so early in the season.

As to the deposits from these overflows, I have made no accurate observations, nor can I procure any very reliable information. They are generally confined to those plantations upon which the crevasses occur, and are deeper about 15 or 20 acres from the river, where the water meets with the resistance of the forest growth and with other obstructions."

April 15th, 1883, Dr. Fox further reported as follows: "contrary to my expectation, no unusual sickness occurred after the overflow of 1882. A number of cases of malarial intermittents have occurred during the past few months, but not more than in ordinary years."

Dr. J. B. Wilkinson, reported, April 29th, 1882, as follows:

"Fortunately for us, the overflow this season in this parish has been very limited to this date and we hope may not extend. During or subsequent to an overflow in 1847, a malignant dysentery prevailed in the portions of this parish inundated.

It did not show itself until late in the fall and it continued during the winter.

The greatest overflow that we ever experienced here, was from the Bell Crevasse of 1858. It was confined to the right bank. The river kept up until late in August; the total number of days of high water here were 119. Following this overflow, a great deal of pneumonia occurred during the *late fall* and winter. On one plantation it was so serious, that work was much impeded by the large number of negroes confined to the hospital at one time. Although cases of pneumonia are found here every year, I never witnessed this disease as an epidemic in this parish, except following the overflow of 1858.

From my observation of the locality or localities of sickness succeeding overflows, there is no tendency to greater suffering where the river deposit mainly takes place, than in localities overflowed, but more remote from this point. On the contrary, the instances observed by me, where sickness prevailed to the greatest extent, were remote from the levee-breaks, around which the greatest deposit always takes place.

The large amount of stagnant water which will be sure to remain in the swamps this year, warrants the belief that the overflowed districts will suffer to a greater extent than usual from sickness. We may look for fevers in August, September and October, and dysentery and pneumonia afterwards. I hope this anticipation may not be verified. Should any phenomena present themselves to my observation, regarding health connected with the present overflow, it will give me pleasure to relate them to you."

April 15th, 1883. Dr. Wilkinson farther reported as follows : "I left Louisiana in July last, and did not return until autumn, so that I had no opportunity for personal observation during that period. However, semi-weekly letters informed me that our district was unusually healthy, and, on my return, my confrères corroborated the information sent me. There was no unusual prevalence of dysentery or pneumonia during the autumn and winter. In July and August, there was an unusual rainfall, which kept the ground saturated after the flood receded and maintained an unusually low mean tempe-

rature. To this large rainfall, associated with depressed temperature, I attributed the good health of this Parish during the summer of 1882."

WEST BATON ROUGE PARISH.

Dr. Richard H. Day, one of the oldest and most reputable physicians of Louisiana, long resident in the city of Baton Rouge, reported April 30, 1882, as follows:

"General experience and close observation justify me in saying most positively that *an increase of sickness is invariably the result of overflows*, both in the districts inundated and in their adjacent neighborhoods. This result may be greatly modified by the falling of heavy rains during the subsidence of the flood--that is, if frequent and heavy showers of rain occur during such time, the deposits are washed off the lands into the streams and less sickness is the result. If, on the contrary, but little or no rain falls, the accumulated deposits remain to undergo decomposition, and much and graver sickness ensues, if not as a result, as an accompaniment. The character of this sickness, succeeding overflows, is clearly what we designate as of malarious origin--malignant intermittents, and remittents, dysenteric and haematurial diseases being dominant and asthenic in type.

This was observed on several occasions, while I was residing in the Attakapas* country, a large portion of which, indeed, all on the east side of Bayou Têche and of the Atchafalaya River, consists of low lands subject to frequent overflows.

Since I have been living in Baton Rouge, the same has been observed in reference to the low lands of West Baton Rouge and of the Grosse Tête country. So, though I cannot be precise as to dates, I can be in reference to the general results of overflows upon the health of the inhabitants."

POINT COUPEE PARISH.

Dr. Peter Randolph, my relative and a resident on False River for nearly thirty years, reported May 24th, 1882, as follows:

* The section of country formerly designated as the Attakapas, included the whole or parts of the present parishes of Vermillion, Lafayette, St. Tammany, St. Martin, St. Mary, Iberia and St. Landry.

"During all of the sixteen years from 1866 to 1881, excepting the five years 1870-1-2-3-9, this section of my parish has been partially inundated, that is, a large portion of the fields have been flooded from the rear, but the dwellings, fronting on the higher bank of False River (in truth a lake), have not been invaded. These repeated floods have been due to the inability or negligence of the State to close the Grand Levee near Morganza, which is about fifteen miles distant from my neighborhood.

Since the water has a long course, through forests and brush-wood, before it reaches us, the floods leave here no deposits. These are always near the breaks in the levees.

In 1866 the flood came in May and left in July. In 1867 the flood came in March and did not leave the fields until August 11th. With this flood there came some choleraic influence, and in the fall a very fatal fever broke out which was here considered yellow fever, but at other places it was reported by some to be haematuric fever.* I do not think the flood had anything to do directly with either of these outbreaks. Exposure, fatigue, poverty, insufficient and improper food did no doubt exercise unfavorable influence. With these exceptions, the eleven floods referred to do not seem to have been attended by any disturbance of the public health.

I attribute the failure of our floods to influence health unfavorably to the two following facts: When the water has begun to recede rapidly we have invariably had copious showers of rain, and, even when there has been a most disagreeable stench, the air has become perfectly sweet a few hours after a rain. After an overflow, the growth of vegetation on our alluvial lands is almost magical, so rapid that the ground becomes covered in a few days after it becomes dry. Thus, much is absorbed from the atmosphere that would be poisonous to man."

April 9th, 1883, Dr. Randolph farther reported as follows:

"In my immediate neighborhood it was as healthy, after the overflow of 1882, as usual; but, in every other part of the

*In 1867 New Orleans and many adjacent places suffered from a very severe epidemic of yellow fever.

parish, more sickness was reported than I ever heard of before, after a residence here of twenty-seven years. I attribute this difference between my neighborhood and elsewhere in the parish to the fact that the people just around here did not receive the great brunt of the water, they were also in better condition to protect themselves than in other localities and were probably better fed."

In addition, Dr. Randolph gathered information from five other physicians in his parish, viz.: Drs. Carruth, Ginn, Ladmirault, McCaleb and Smith. All testified that there was an unusual amount of sickness in 1882, chiefly malarial, and that the fevers were more obstinate than usual. Four testified that haemorrhagic malarial fevers were unusually frequent, from which the oldest and most experienced, Dr. Ladmirault, dissented. Four testified that whites and blacks suffered equally. All testified that the sickness increased *after* the water receded. Drs. Carruth and McCaleb attributed the unusual sickness to the overflow; Dr. Smith attributed it primarily to the overflow, but immediately to the decomposition of vegetable and animal matter, which the overflow increased. Dr. Ladmirault confessed that he did not know whether the overflow caused it or not; and Dr. Ginn declared that in his opinion the overflow was not the cause of the unusual sickness.

CONCORDIA PARISH.

July 10th, 1882, the New Orleans *Picayune* quoted from the Concordia *Eagle*, as follows: ' So far, the health of our parish is good and bids fair to be as healthy as any preceding year. We are fully satisfied that an overflow, though detrimental to the planter's interest, is yet the harbinger of health. In the midst of all our troubles we are blessed with good health which is the greatest blessing man can enjoy.'

TENSAS PARISH.

June 13th, 1882, the New Orleans *Times-Democrat* quoted from the North Louisiana *Journal*, of St. Joseph, Tensas Parish, as follows: "We have heard the assertion often made

that, after an overflow, a healthy summer would ensue, yet quite the contrary has proved to be the case so far this season, for there has been, ever since the subsidence of the water, and still is considerable sickness in town and in the country surrounding."

EAST CARROLL PARISH.

Dr. F. R. Bernard, a highly esteemed graduate of 1876, since when he has practiced at Lake Providence, reported December 5th, 1882, respecting this extreme northern parish as follows:

"A portion of this section of country, lying south, perhaps fifteen miles from here, and comprising at least twenty miles square, was almost entirely submerged by the recent flood of 1882. It was inhabited by about 3000 persons, chiefly negroes. Among these could be found all varieties of disease whose paternity is referable to paludal and miasmatic agencies: intermittent, remittent, and continued fevers—the latter possessing the concomitant symptoms of typhoid—were the unwelcome visitants to every hut and mansion of these distressed tillers of the soil. Diarrhoea, dysentery and bowel derangements were prevalent and might be catalogued with the fevers already mentioned. But to say what additional amount of disease was invoked by the waters, is quite beyond my power. Physicians living in the locality in question are entirely too lethargic to take the trouble to furnish me with the facts, and I don't live near enough for personal observation.

Intelligent and responsible citizens, however, whose homes are in the overflowed portions of the parish, ascertain that there was an increase of disease not less than 25 per cent. in excess over any previous year in their remembrance. Many have told me this but it is really incredible. The sickness, I believe, appeared principally when the water had receded. In many instances, it was of a fatal type, and generally difficult to control. Sandy concrete deposits averaging a depth of two feet, exhibited themselves on the departure of the water."

The evidence thus far presented has referred to parishes bordering on the Mississippi river, from its mouth to the Northern Arkansas line. Other evidence will now be presented

concerning the Northern Red River country and the Southern Atchafalaya or Attakapas country.

NATCHITOCHES PARISH (RED RIVER).

Dr. S. O. Scruggs, a well known and experienced physician of Cloutierville, kindly furnished, May 9th, 1882, the following information :

" My observations in regard to overflows and their influence over the sanitary condition of this section of Red River and Cane River, extends largely over a third of a century, and I must say that *I have never known an overflow followed by any notable augmentation of the diseases incident to this locality.* The greatest overflow, ever known on Red River, was that of 1849, which occurred in August and, though the water receded early in September leaving thousands upon thousands of acres of land exposed to the burning heat of that hot and unhealthy month, yet there was no visible increase of summer and autumnal fevers.

Again in 1851, the whole country was overflowed, yet the summer and autumn of that year were the healthiest I ever experienced here, save in 1855.

Again in 1866, the entire country was under water, and yet the summer and fall following were extremely free from disease. This is somewhat opposed to the theory that overflows produce disease and death. They may do so in other regions, but they certainly have not done so during my long residence in the bottom lands of Red River. On the contrary they have oftener been followed by extremely healthy seasons. The receding water being followed by showers of rain accounts no doubt, in some degree, for the healthiness of the country after some overflows. The great flood of 1849, was more disastrous to the planters of Red River, than the flood of 1882 has been to the planters of the Mississippi, for, the Red River commenced rising in June and only ceased to rise on the 21st of August, having been for over a month from eight to twelve miles wide. When the waters receded, leaving this large amount of land exposed to the scorching rays of a September sun, no rain followed, nor was there any augmentation of disease ; on the con-

trary, it was *unusually healthy*. Nearly every planter lost his entire crop, and the exposed fields, which had been recently covered by from three to four feet of water, were a source of alarm, save among the creoles who often said to me "*c'est rien nous n'avons pas peur.*" This was evidence to my mind, that while the creoles had long been accustomed to the ravages of overflows, they did not fear the sequelæ, so far as their sanitary condition was concerned."

ST. MARY'S PARISH (ATCHAFALAYA RIVER).

Reports were received from four contributors living in different parts of this parish. Dr. S. M. Abbay, of Centreville, a village between Pattersonville, to the east, and Franklin, to the west, wrote, May 2d, 1882, to the following effect: Dr. Abbay had never witnessed an overflow until April, 1882, when a portion of Centreville was inundated. The public health had not been apparently impaired to May 2d. "Dr. C. E. Allen, of Centreville, has stated that the summer following the overflow of 1874 was healthy. In the Mississippi valley the old planters say that a healthy summer always follows high water."

Dr. C. M. Smith of Franklin, President of the local Board of Health, and an ex President of the Louisiana State Medical Society, reported, July 21st, 1882, as follows:

"Since the subsidence of the flood, an unusual amount of sickness has prevailed throughout the parish of St. Mary, and especially has this been the case along the Bayou Têche, both in this village and on every plantation. While there has been *less than usual of malarial fever*, dysentery and diarrhœa prevail everywhere in an epidemic form and, in some localities, a few cases of typhoid fever have occurred. It is a noticeable fact that the most malignant forms of disease have been observed in the lower portion of the parish where the lands were submerged on both sides of the river and where no preventive measures were adopted. Seasons of overflow, according to my observations, have heretofore been *invariably followed by healthy summers*, and this accords with the experience of every physician with whom I have conversed. It is evi-

dent to me, that the widespread prevalence of the diseases named, in a region of country usually healthy, is due to the deposit left by the recent remarkable flood, which, for the first time since 1828, invaded almost every dwelling and left under many houses stagnant pools containing all the elements of disease. If the people could have been persuaded in time to adopt a proper system of drainage and disinfection, much of the evil that has resulted would have been avoided. The large mortality during the present summer, from diseases which are known to be preventable, will serve as a warning to only the intelligent few, while the ignorant multitude will continue their opposition to all hygienic measures and recommendations adopted by the Board of Health for the public good. Until a well-regulated system of sanitary laws is adopted by the legislature and strictly enforced, our people will continue to suffer and die from causes that can and should be removed."

April 19th, 1883,—Dr. Smith farther reported as follows:

"In my opinion, the increase in local disorders was due to the overflow, and not to bad diet. There was the usual abundance of good, wholesome food everywhere except for a short period in the lower portion of the parish where the overflow was general and the land entirely submerged. In this section, there was a scarcity of food for a few days, but during the most of the period of high water, the laborers were supplied with provisions both by the planters and by means of rations issued by the U. S. Government. Many buildings were swept away by the flood, and the negroes on each plantation were compelled to find shelter in the few cabins that remained or in the sugar houses. Impure air and accumulations of filth, resulting from over-crowding and the enforced confinement of large numbers of negroes in small apartments, must have been important factors in producing such diseases as dysentery, diarrhoea, typhoid fever, etc. These diseases, however, prevailed in all portions of the parish and only became general after the water had subsided. From the village of Centreville to the extreme upper line of the parish (at Jeauerette), there was no general overflow on the west side of the bayou Têche, but the water reached the plan-

tation quarters everywhere and was under almost every dwelling on the banks of the Têche.

Malarial fevers prevailed to a very remarkable extent throughout the parish of St. Mary during the months of August, September and October, continuing with unusual severity until the middle of November, from which period they abated. In many cases of fever, both of the intermittent and remittent type, the thermometer indicated a temperature of 106°. This unusual prevalence of malaria, during the summer and autumn of 1882, was not confined to any section or neighborhood, but was general throughout the parish, as I have ascertained both from personal observation and from conversations with physicians.

The deposits upon the land and under dwellings of decomposing vegetable matter, and accumulations of filth (both vegetable and animal) around dwellings and especially in the negro quarters; pools of stagnant water left by the flood and the entire neglect of drainage after the water had subsided; miasmatic effluvia, from the recently overflowed swamps in the rear of plantations and bordering on Grand Lake, were undoubtedly the principal causes of disease. The amount of rainfall was much less than usual and Northerly winds prevailed throughout the summer and fall months. Thus, contrary to all former experience, the deposit remained on the soil exposed to the action of sun and air, and malarial disease, in its various forms, became more widespread than during any previous year. It is a fact worthy of notice that more cases of fever, and of a worse type, occurred among the negro women and children remaining in their cabins and about the quarters, than among the men at work in the fields or cutting wood in the swamps. May not this be due to some poisonous principle, engendered by a mixture of such decomposing animal and vegetable substances as are always accumulating about the houses of plantation laborers?"

Dr. L. W. Tarleton, of Pattersonville, reported June 21st, 1882, as follows: "The water flooded this part of the parish April 2d, and remained nearly four weeks. I have not noticed any bad effects, as far as concerns health, except in one par-

ticular. We have had an epidemic of acute dysentery with other bowel troubles; the mortality has however been very small, not five per cent. Otherwise, this section is exceptionally healthy; it has been *entirely exempt from any of the fevers so common in this climate at this season.*"

Dr. L. A. Burgess, then at Bartel's Postoffice, near Pattersonville, but now at New Iberia (Iberia Parish), contributed the four following interesting and valuable communications on May 11th, July 6th and 14th, 1882, and April 17th, 1883:

May 11th, 1882. "I write to acknowledge receipt of your circular letter, dated 26th April, asking information relative to influence of overflows on health. In reply I answer that I have had no experience with overflows prior to 1882, having always lived in sections of country high above floods. My experience, however, with the present one is ample, but it is too early to make report on its influences on health as it has only partially subsided. The swamps are still under water from three to fifteen feet deep, and fully one-half of the cultivated land on the east bank of the Têche is still submerged. When the water entirely subsides, and we have the semi-tropical heat of summer, then I will give you such facts as I have observed or as may be of sufficient value to report. Up to this date, the public health, within the circle of my own immediate observation, is as good as usual at this season, and, as far as malarial fever is concerned, better than last year."

July 6th, 1882. "Up to this date (July 6th), evidence is wanting to show that the overflow in this section has *directly* exerted any deleterious influence on public health. On the contrary, it is reasonable to believe that it has proved a very salutary measure in a sanitary point of view, for the reason that, owing to the rapidity of the current, every particle of filth was scoured out and washed away into the swamps. No sanitary commission, clothed with the most despotic power, could more effectually cleanse a town or city, than did the overflow scour out and wash away all filth accumulations on the Têche. In other districts where there were no strong currents but eddies and dead or still water, it is likely that unhealthy conditions have been directly developed by the flood.

Indirectly, the overflow here has perhaps caused a greater prevalence of diseases of the digestive organs than would have otherwise obtained, but even of this positive proof is wanting, for, these diseases often prevail when there has been no overflow. Be that however as it may, diarrhoea and dysentery have been unusually prevalent since the water subsided, and I suppose we must attribute this to an unwholesome diet, and to privation, exposure and destitution in various forms, all the certain accompaniments of great catastrophes, no matter how induced.

Malarial fevers are less prevalent by one-half than last year at this date; but whether this exception is due to the washing away of all surface filth or not I do not know; but I do know that some years without an overflow, the country is singularly exempt from malarial fever.

I fail to note any dead animals or accumulations of dead fish, though looked for; and so often alluded to as important factors in poisoning the air of overflowed regions, I saw none of either kind, and believe they oftener exist in imagination, than in reality. Owing to the rapid current, the amount of deposit was trifling; had it been greater I do not think it would have been productive of unhealthiness; for, as soon as the water subsided, it would have been covered by a dense growth of weeds and grass which would have effectually protected it from the action of solar heat, and it is through this agent that terrestrial poisons are set free.

The deprivation of all fresh vegetables, the extreme scarcity of fresh meat, and the almost universal use of salt pork, together with the almost unlimited use of catfish and crawfish, as articles of diet, have had more to do in producing sickness, and in modifying disease than all other causes combined."

July 14th, 1882, "Yours of the 8th inst. to hand, and, in compliance with suggestions therein contained, I submit the following information additional to my former letters relative to the influence of overflows on health.

The area of country to which my observations apply, comprises all that portion of the bayou Têche, extending from the lower line of Fairfax plantation, this having been the upper

limit of the overflow on the west side, to Glenwild plantation, on the Atchafalaya River, and, when measured by the sinuosities of these two streams, would equal fifteen miles. A few words on the topography of the overflowed district may, I think, materially aid one, not acquainted with the country, in more fully appreciating the character of the overflow, the cause of the strong current, its force and its beneficial influence in a sanitary point of view.

The surface of the country is flat, of alluvial formation and raised not over ten feet above sea level. The Têche, a very sluggish tide water stream, and navigable for large steamboats, empties into the Atchafalaya, one and half mile above Pattersonville. The arable land comprises a narrow strip on each side of the bayou Têche, varying in width from a half mile to one and a half miles and, where this arable land ends, a cypress swamp commences, which, on the east or north bank, intervenes between the plantations and Grand Lake, and on the west and south side, the swamp lies between the plantations and the sea marsh. These swamps are from a half mile to a mile or more wide, and are usually covered with water a few inches deep, except in periods of long drought. Grand Lake commences three miles above Morgan City, and runs parallel with and distant from the Têche from one to four miles or more. It extends beyond the limits of the parish, and reaches nearly or quite opposite to St. Martinsville, in St. Martin parish. It is a broad, shallow lake, or more properly, the deepest part of a large basin lying between the Mississippi and the Têche, and through which the Atchafalaya River flows in its course to the gulf.

The Têche, like all other streams running through alluvial lands and subject to overflow, has the highest land immediately on its banks, and this higher land slopes gradually towards the swamps on each side of the stream, thus forming two inclined planes. The flood water, which devastates this section, comes down the Atchafalaya River and also from breaks in the Mississippi River levees, both above the northern extremity of the Atchafalaya and also below it, as low down as West Baton Rouge parish. As both banks of the

Têche are on a level or of the same height, it follows that, as long as the crest of the east and north bank is above water, this crest acts as a protection levee to the whole west and south side. Therefore, the latter remains perfectly dry while the east and north side is being gradually inundated, but as soon as the water gains the crest of the bank, it pours over and rushes down the western incline plane to the swamp and through it to the sea marsh. This rush of water across the west side of the Têche was unbroken from Fairfax to Glenwild plantations. I do not know the velocity of this current. It was strong enough to wash down negro cabins and other light buildings, to wash down fences firmly posted in the ground, to remove coal piles and scatter the coals across the plantations and to wash away the front land as deeply as it had been broken by the plow—say five inches.

On the east side there was no current until the water ran over the top of the bank. The flood water poured down the Atchafalaya, filling the basin of which Grand Lake forms the lowest part and, continuing to rise, flooded the cypress swamp between the lake and the plantations, and made its appearance in the plantations next to the swamp about the 15th March. This swamp is an almost impenetrable jungle, formed of trees, underbrush, vines, briars, etc., and these evidently acted as *filters* in relieving the turbid flood water of the greater portion of its sediment before reaching the open fields, where only the lighter and finer silt was deposited.

From notes made as each following event occurred, I find that the overflow was general on Tuesday, April 4th. On Sunday night, April 9th, the water ceased to rise and came to a stand and remained so until Thursday, April 13th, when it commenced falling and continued to do so gradually until April 25th, when the left bank of the Têche emerged above water. By the 15th May nearly all the land on that side was clear of water. On the east side the fields were not entirely freed from water before the 25th of June, as its fall there was governed entirely by the fall of the water in the Atchafalaya River.

The crest of the great overflow wave, coming down on the Têche district, reached it March 31st, when in 24 hours the water rose 11 inches, and continued to rise at this rate for nearly 48 hours, after which it gradually diminished until brought to a stand, on the 9th of April. On Tuesday night, April 12th, a heavy storm occurred which did much damage to buildings and, blowing against the current, raised the water six inches, which, however, rapidly subsided to its former level soon after the gale ceased.

As for the population, white and colored, remaining in the overflowed district, it is mere guess work to make even an approximate estimate of the number, for the reason that, during the overflow, and after its subsidence, a great many people, white and black, left for higher and more favored lands and the exodus still continues. However, I will attempt this, and think the better plan to get as near the truth as possible will be to give a list of all plantations and average the population of those I do not practice on by those I do :

Name of Plantations.	No. Whites.	No. Negroes.	Name of Plantations.	No. Whites.	No. Negroes
Fairfax.....	6	40	Victoria.....	1	40
Ricohoc.....	3	30	Waveland.....	3	50
Mound.....	4	25	Williams.....	3	30
Grand Woods...	14	50	Como.....	2	25
Pecan Grove....	17	50	Evangeline.....	10	10
Calumet.....	15	70	Lagonda.....	15	50
Avalon.....	4	40	Pine Grove.....	5	40
Wendel.....	6	15	Glenwild.....	5	60
Luckland.....	20	50	Pattersonville		
Moro.....	7	40	Village.....	200	200
Lynch & Cropper	10	50			
Totals.....				350	965

The above figures give a total population on the west side of the Têche and Atchafalaya, from Fairfax to Glenwild plantation, 350 whites and 965 negroes or a total of 1314. Now, on the east side of the Atchafalaya, commencing opposite Pattersonville and extending two miles below Glenwild, there are several large plantations and a number of smaller ones ; but,

I know very little about this section, and think a statement giving as its population 100 whites and 400 or 500 negroes, a very liberal estimate. We will put it at that, which added to the numbers on the west side, gives a total population of 450 whites and 1365 negroes, or a grand total of 1815. This, I am satisfied, is somewhere in the neighborhood of the truth ; nothing short of an actual census can give correct numbers.

Those, who interested themselves in procuring government rations during the overflow, enormously overestimated the population ; telegrams went abroad that 4500 persons, from Fairfax to Pattersonville, were destitute and starving, which was a frightful exaggeration of the entire number of people within these limits. As to starvation or destitution at that time, there was no evidence that either existed. I saw none during the overflow, which came suddenly and unexpectedly, and plantation work on the west side was continued until the day before the water broke across. There was plenty of work to do at fair wages and all, except a few profligate drunken negro tramps and bummers whose loss by the flood would have been a good riddance of bad rubbish, had money and provisions on hand, amply sufficient to carry them through the watery siege to which they were to be subjected. Such at least was the case here, and the novelty and excitement attending the overflow, and its continuance no doubt contributed to preserve health, as the amount of sickness was trifling during its continuance, *except among children under five years of age*, and here it was the diet and not the overflow that caused it,

Whenever infants are placed on a diet of solid food, such as salt pork, fat meat, crawfish, heavy indigestible bread, etc., and diarrhoea and dysentery assail them, it does not require much trouble to find the cause of it. But then it is handy and easy to charge it to an overflow as this saves time in investigating the causes of disease.

The only sickness, prevailing at this date, still continues to be diseases of the digestive organs, chief among which are diarrhoea and dysentery. The different forms of malarial fever

have not increased, there are but few uncomplicated cases of it, and, although not much given to predictions, still I will venture the prediction that, so far as malarial diseases are concerned, it will be a healthy year. I think I have good reasons for this belief but want of space forbids my stating them here. There is nothing peculiar or specific that I can discover about the diarrhoea and dysentery, now prevailing. There is a good deal of entero-colitis among young children and it often proves fatal among negro children; but, when the profligacy and utter worthlessness of the negro women is honestly estimated, it is not surprising that many negro children die who might, under more favorable surroundings, be saved."

April 17th, 1883, Dr. Burgess farther reported as follows:

"I moved from St. Mary's parish to New Iberia, my present abode, on the 25th of July, 1882, and cannot, therefore, give any information based upon personal observations, as to the health in that section after the above date.

Malarial fevers were quite prevalent in the country round-about New Iberia, last August, September and October, where no overflow has ever occurred or will ever occur, and this section was distant from the nearest overflowed country about four miles.

It was the prairie country on the west bank of the Têche, along Spanish Lake, and out towards Avery's Island and Abbeville, where intermittents and remittents were so prevalent. In the town of New Iberia, the fevers were not so numerous, although there is nothing about it, in a sanitary point of view, that is commendable.

To conclude, it is my observation that, in the swampy regions of Louisiana, it is unnecessary to have overflows to produce malarial fevers and bowel diseases, notably dysentery, as these are all quite frequent every summer and fall whether there is an overflow or not."

GENERAL EVIDENCE ON THE INFLUENCE OF THE OVER-FLOW OF 1882.

In March, 1883, a sanitary authority stated that, "last summer it was expected that terrible epidemics would follow

the Mississippi overflows, but these expectations were not realized." In the Annual Report of the New Orleans Charity Hospital, for 1882, published in 1883, the house-surgeon, Dr. Miles, alludes "to the unusually wide prevalence of malarial fevers in the inundated districts of the State." Prof. S. M. Bemiss, my colleague, reported in the Philadelphia *Medical News*, December 2d, 1882, as follows, in reference to the "Health of New Orleans," and the sanitary results of overflows:

"This city has enjoyed a rather remarkable exemption from sickness during the past season. The overflow of the Mississippi in the spring has been followed by intensified malarial diseases in many parts of the valley, and by dysentery in some parts of the overflowed districts. It is true, however, that some portions of the inundated regions have been exempt from all forms of disease not usual to them. The proper explanation of this apparent difference in effect is due to the accidental circumstances affecting the various localities. First, wherever the currents produced by the escaping waters swept the surface, no sickness was likely to ensue. Second, wherever very deep deposits were formed, the circumstances were not favorable to the evolution of malaria. But, third, wherever slight deposits occurred from the stagnant water, violent malarial diseases have prevailed."

FOREIGN EVIDENCE.

Colin, page 594, of his *Maladies Epidémiques* (1879), states, that malarial epidemics *sometimes* result from inundations and quotes from Foissac, as follows: "Thion de la Chaume reports that the Arabs wishing to avenge an insult inflicted by the inhabitants of Bassora, caused the river which surrounds it to overflow; and the result was that, when the water receded, an epidemic victimized 12,000 or 14,000 persons. Analogous examples are recorded in the wars of our own country. In 1748, during the war of the Austrian succession, the Dutch inundated their kingdom to defend themselves; when this occurred the summer was burning hot, the preliminaries of peace were then signed and the flood was made to

recede; thereupon a grave epidemic developed and the government ordered a renewal of the inundation until winter should appear."

Boudin, page 520, Vol. II, of his *Géographic et Statistique Medicales* (1857), states that inundations of the Rhine repeatedly caused at Strasbourg a great increase of malarial fever. The great inundation of 1824 was followed, during the four succeeding years, by a very great increase of intermittent fevers with a corresponding decrease in continued fevers.

Dr. Macgowan, unknown to me, recently forwarded a published article from Hankow, China. In this, he treats of the "so-called unprecedented flood," in July and August, 1882, of the Yangtsze river, which traverses the centre of China and empties into the sea at Shanghai.

This interesting article closes as follows:

"Fluviatile inundations are followed in many parts of the world by outbreaks of intermittent fever and various maladies, while others, as those of the Mississippi, are not inimical to public health, as has been shown by New Orleans statistics published by Dr. Chaillé. On inquiry, I find that the Yangtsze floods do not give rise to zymotic diseases. I have examined the register of the Mission Hospital under charge of Dr. Mawbey, Hankow, and can discover no evidence of disease being unusually rife after the periodical floods subside; and foreign residents concur in affirming that floods have never proved sources of ill health. On the contrary, it is believed that the surplus waters cover and destroy malarial germs, which is supposed to be the case at New Orleans. Still, I find that although the Yangtsze does not deposit organisms which become zymotic germs, some natives believe that ague is rather more common when the waters retire than before. In one respect the floods certainly prove hurtful; field laborers, by constant wading, suffer very extensively from ulcerated legs. In deplored the consequences of deforestation, I omitted to state that forest thinning has had a counterbalancing effect in the south of China, reducing the ravages of jungle malaria, which recedes with the advance of agriculture."

It may be well to add that, while deforestation diminishes the quantity of rain and of soil moisture, thereby injuring agriculture, it greatly favors the rapid flow of water, when rains do occur, into adjacent streams and thereby causes freshets and floods. To prevent these evils, Dr. Macgowan thinks that the Chinese Government will be forced to interfere. Spain and other countries have been compelled to plant trees to protect their improvidently denuded lands from alternate drouths and floods.

In concluding this foreign evidence on the sanitary influence of floods, the probability is worth noting, that if floods habitually caused epidemics or disease, the records of medicine would cite many more instances thereof than I have been able to find; for, partial inundations have always been and continue to be very frequent in every part of the world.

SUMMARY AND GENERAL CONCLUSIONS.

All of the evidence I have been enabled to collect has now been presented. The evidence of my ten correspondents varies from that of Dr. Day, who testifies that "an increase of sickness is invariably the result of overflows," to that of Dr. Scruggs, who testifies that he has "never known an overflow followed by any notable augmentation of the diseases incident to this locality." However, it is noteworthy that those, who testify to evil results, fail to discuss and thereon to decide whether these results were not coincidences rather than consequences, or whether the floods did not cause the insanitary evils, indirectly rather than directly. On the whole, the weight of all the evidence preponderates in favor of the view that floods do not generally cause disease directly. No evidence is required to prove that floods may impair health indirectly or secondarily; that is, to the variable extent that they may cause, as they frequently do, such insanitary conditions as anxiety of mind, exposure to the weather, wet and scanty clothing, insufficient and improper food, overcrowding in places of refuge, befouling the drinking water of wells and springs with such disease-poisons as those of typhoid fever, cholera, malaria, etc.

But, the questions of chief consequence are, what insanitary conditions result *directly* from floods and what are the diseases caused thereby? The changed conditions, which immediately result, are only two, viz: increased humidity of the air and submersion of the water-logged soil. Aerial humidity is not in itself injurious as is proved by the healthiness of those who live on the water, whether salt or fresh; and, experience has amply proved that health is protected by covering a malarial soil with water. Now, throughout all the country subject to overflow by the Mississippi river, the malarial poison is not only the chief disease-poison, but it is also the sole poison which specially characterizes and ravages this section. Hence, if the floods of our river cause disease, other than is caused by the floods of rivers in non-malarial countries, such evil influence should be observable specially in respect to the malarial poison. In truth, the influence is beneficial as long as the malarial soil continues to be well covered with water. However, when the flood subsides one new condition is always and two other new conditions may be developed. The water-logged malarial soil is always exposed to sun and air; in addition, the receding water may leave behind it both stagnant pools and accumulations of decomposing filth. Such soil, pools and filth are detrimental to health and often exercise an unfavorable influence, specially on malaria. But, these three evils vary greatly in amount; varying with the weather, with the irregularity and other peculiarities of the soil, with the force and velocity of the receding current, etc. Thus, in one locality the earth may be promptly relieved of its extra subsoil water, there may be no stagnant pools, and a strong current may effectually cleanse away the filth; while, in another locality these three conditions may be very noxiously reversed.* Farther, it is taught, that moist alluvial malarial soils and stagnant ponds require a hot, "drying up" season to intensify their malaria; and that, while heavy rains often seem to be necessary to develop the malaria in soils usually dry, yet freedom from rains and drying up of the earth are required to increase the malaria of wet soils and marshes.

* In this section of country, sub-soil water and aerial humidity are excessive, independent of overflows.

Inasmuch as overflows are associated with such varying conditions as have been suggested, it is manifest that the sanitary results may vary not only at different places and seasons, but also even at the same place and season from one flood to another. These varying conditions require more careful study and record, and it is hoped that this article may stimulate physicians, in localities subject to overflow, to more thorough and accurate observation.

In the meantime, it is satisfactory to find that the evidence thus far collected indicates that overflows do not cause inevitably or generally any notable increase of malaria or of other disease, and that they certainly do not usually either cause or promote epidemics. Therefore, the direct influence of overflows on health is not usually to be dreaded.

